

Main Article:

PhD by Publication: A Student's Perspective

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Abstract

This article presents the first author's experiences as an Australian doctoral student undertaking a PhD by publication in the arena of the social sciences. She published nine articles in refereed journals and a peer-reviewed book chapter during the course of her PhD. We situate this experience in the context of current discussion about doctoral publication practices, in order to inform both postgraduate students and academics in general. The article discusses recent thinking about PhD by publication and identifies the factors that students should consider prior to adopting this approach, in terms of university requirements, supervisors' attitudes, the research subject matter, intellectual property, capacity and working style, and issues of co-authorship. It then outlines our perceptions of the advantages and disadvantages of undertaking a PhD by publication. We suggest that, in general, the advantages outweigh the disadvantages. We conclude by reflecting on how the first author's experiences relate to current discussions about fostering publications by doctoral students.

Keywords: doctoral education; PhD by publication; publication output; research student; thesis

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1. Introduction

This article reflects upon the first author's experiences of undertaking a PhD by publication, as a series of nine journal articles and one peer-reviewed book chapter. Its purposes are to inform and, hopefully, inspire other doctoral scholars and their supervisors, and to contribute to contemporary discussions of doctoral publication practices (e.g., Aitchison & Lee, 2006; Kamler, 2008; Lee & Kamler, in press; Powell, 2004; Wilson, 2002).

The model of PhD by publication is not new. Wilson (2002) notes, "[t]he introduction in the mid-1960s of the published work route to a British PhD was a major, if somewhat controversial, innovation" (p. 71). As Park (2005) has observed for the UK, "the traditional PhD model is now being challenged by a growing diversity of types of doctoral degree, including PhD by publication, Professional Doctorates, and New Route PhD" (p. 190). The features of each of these types are summarised, for the case of the UK, in Table 1. However, as Powell (2004) reports, uptake of the PhD by publication model in the UK has been limited, and generally remains differentiated by university rules from the traditional PhD.

Table 1. *Summary of UK Doctoral Award Types*

Award	Characteristics
Traditional PhD	Based largely on the supervised research project, examined on the basis of the thesis.
PhD by publication	Based largely on the supervised research project, but examined on the basis of a series of peer-reviewed academic papers which have been published or accepted for publication, usually accompanied by an over-arching paper that presents the overall introduction and conclusions.
New route PhD	Contains significant taught elements (which are examined and must be passed), and initially developed in 2001 to provide international students with an integrated doctoral training scheme including programme-related research training, and personal and professional development.
Professional doctorate	Includes a significant 'taught' element, and as such most have specific 'learning outcomes.' Based on a combination of taught modules (which are examined and must be passed) and the supervised research project, which is often smaller than the traditional PhD, is more applied and is work-based or work-focused.
Practice-based doctorate	Based on a supervised research project, usually in the performing arts, where the output involves both a written piece (which is usually much shorter than the traditional PhD thesis and includes both reflection and context), and one or more other forms, such as a novel (for creative writing), a portfolio of work (for art and design), or one or more performance pieces (for theatre studies or music). Both forms of output are examined.

Note. Reproduced with permission from Park (2007, p. 33).

There are a number of reasons, both institutional and pedagogical, favouring PhD by publication. A strong impetus has been the implementation of university funding models which reward publication and research student completions, as has happened in Australia and the UK (Taylor, 2001). Consequently, rules enabling PhD by publication have become widespread in Australia since the late 1990s, as universities have sought “to enhance an institution’s research profile and publication output; and, through the PhD by publication route, secure both degree completions and increased publications simultaneously” (Cuthbert & Spark, 2008, p. 79). Because “low publication output is . . . a consistent feature of doctoral programmes in the UK, USA, Australia and elsewhere” (Kamler, 2008, p. 283), increasing the number publications from research students is an obvious strategy for increasing overall institutional output. In these terms, it could also be argued that PhD by publication is one means of delivering “a central tenet of doctoral research . . . that the work achieved should have an impact on other knowledge in the field” (Powell, 2004, p. 7).

There are also strong pedagogical reasons for favouring publication by doctoral students. Kamler (2008) reviews the relatively few studies that assess relationships between the publication of students’ PhD work and their subsequent scholarly activity; all the available evidence suggests success in publication of PhD work is well-correlated with--perhaps even the best predictor of--subsequent scholarly productivity. She argues that a range of factors other than merely encouraging doctoral students to publish--principally “serious institutional attention, and skilled support from knowledgeable supervisors” (p. 284)--are necessary to enable doctoral publication, and that “greater pedagogical attention needs to be given to writing for publication, and that doctoral education is a significant place to intervene” (p. 284) if academic publication rates more generally are to be improved. In this context, too, there seems much to recommend PhD by publication as one of the “multiple ways to foster doctoral publication” (Kamler, 2008, p. 285). For these reasons, many higher-education institutions are adapting the rules governing their PhD degrees to enable, and encourage, their postgraduate research students to progressively publish their work in peer-reviewed journals, rather than adopt the traditional path of publication subsequent to presenting their thesis as an unpublished volume at the conclusion of their studies. The recently-developed guidelines of the relevant college of our own university, reproduced as Exhibit 1, are illustrative of the requirements for such PhDs.

Exhibit 1. *PhD by Publication Guidelines, College of Science, The Australian National University, May 2008*

PhD by Publication
College of Science Guidelines

The thesis will be based on a number of publications in international peer-reviewed journals or papers submitted for publications. The candidate will have made significant contributions to the publications.

In addition, an extended context statement will be provided. This will include a brief introduction to the field of study, and the experimental/ theoretical techniques employed. There will be a summary of the outcomes of the project.

Specification of the following will be made:

- (i) That the work presented is an accurate account of research performed during the academic program towards the degree of Doctor of Philosophy.
- (ii) Confirmation that the research is on a central topic, and explicit demonstration of the relation between all aspects of the research.
- (iii) Statements for each publication that clearly specify the extent to which the research was the candidate's own, and the extent to which the authorship was their own.

The papers and supplementary material will be on A4 paper (or similar) bound together in single volume.

In our experience, the existence of a choice between undertaking a traditional PhD or a PhD by publication is not always made apparent to students by their institutions or supervisors; nor are the likely advantages and disadvantages of adopting a particular approach. This article provides an individual doctoral student's perspective on the advantages and disadvantages of taking the path of a PhD by publication, in part to better inform prospective and current research students, and academics more generally, about this option. The reflections that follow are set within the construct of a PhD described by Winter, Griffiths, and Green (2000, p. 36):

[A] PhD ought to: (a) be a report of work which others would want to read, (b) tell a compelling story articulately whilst pre-empting inevitable critiques, (c) carry the reader into complex realms, and inform and educate him/her, [and] (d) be sufficiently speculative or original to command respectful peer attention.

The article is presented in three sections. First, we set the background and context for the first author's doctoral research, together with a description of the nine journal articles and the book chapter discussed in the subsequent sections. Second, we suggest the major factors that should be considered in the process of a doctoral student deciding to adopt (or partly adopt) a PhD by publication approach. We conclude by reflecting on how these individual experiences inform the larger discussion of publication by doctoral students.

2. Background and Context

The first author is a current doctoral student at the Australian National University, an "education-intensive research institution" (The Australian National University, 2005) consistently ranked first among Australian universities in international university rankings (e.g., Shanghai Jiao Tong University, 2007; Times Higher Education, 2007). Her PhD program

commenced in March 2005 and will conclude in November 2008; it included a 9-month period of deferral to care for family members. The second author is a senior academic in the same ANU school and has overall responsibility for the school's postgraduate education programs. The interdisciplinary school of which we are members has a strong emphasis on publications output, including that by research students. This is illustrated by the school's 2006 (the most recent year for which complete data are available) publications output: of the c. 120 journal articles published by authors from the school, c. 15 per cent were co-authored by 10 doctoral students and their supervisors, and c. 5 per cent by 7 doctoral students publishing alone (The Fenner School of Environment and Society, 2007, pp. 100-102).

The subject matter of the first author's doctoral research falls within the realm of the social sciences. Specifically, it examines capacity-building within the context of regional governance arrangements for Australia's 56 designated natural resource management (NRM) regions. The research involved: (a) identifying potential capacity-building measures relevant to regional community-based bodies responsible for natural resource management (Robins & Dovers, 2007a), (b) a national survey of key stakeholders' attitudes to and preferences for these, and (c) case studies in four of the 56 regions. During her PhD studies, she also spent 6 months as a Visiting Scholar at the University of British Columbia, Vancouver, to explore Canada's decentralised governance arrangements for watershed management and their relevance to the Australian context.

It is also relevant to note that the first author is a mature-aged student (39 years at the time of commencement), bringing almost 2 decades of work experience to her doctoral research. She has operated her own consulting business in natural resource management since 1998, with a core business interest in science integration and communication. In embarking on a PhD, she was therefore not starting on a new or unfamiliar topic, and indeed commenced writing some of her ideas and experiences for publication almost immediately. The experiences described here may be most relevant to doctoral students who similarly have professional experience and skills relevant to their PhD research; for example, in the case of our school, a relevant professional background characterises more than half the graduate research (PhD and MPhil) students; this proportion is higher than the average at our university. In contrast, students embarking on their PhD studies soon after completing undergraduate degrees will not have had the opportunity to develop comparable professional experience and skills; they may also be undertaking research in a new subject area and/or institutional environment, and their academic writing skills may need further development, through processes such as those discussed by Aitchison and Lee (2006) and Kamler (2008).

Of the nine journal articles discussed in this article, four were published in journals in countries on which the research focused (the Australian journals *Australasian Journal of Environmental Management and Geographical Research*, and the Canadian journal *Environments*) and five in journals with an explicit international focus (*EcoHealth*, *Environmental Management*,

Environmental Science & Policy, *International Journal of Global Environmental Issues*, and *Local Environment*). Citation details for the articles discussed are provided in the References section of this article (Robins, 2007a, b; 2008a, b, c, d, 2009; Robins & Dovers, 2007a, b). The peer-reviewed book chapter was written at the editors' invitation (Robins & de Loë, in press).

3. Factors to Consider Before Deciding to Undertake a PhD by Publication

This section discusses important factors that a student and their supervisors should consider in determining whether pursuing PhD by publication is an appropriate strategy in their particular circumstances.

3.1. University Requirements

The rules governing PhD by publication vary between universities, and it is first necessary for a student considering PhD by publication to establish the specific rules of their university. In our case, the university's Research Awards Rules require specific approval for a PhD by publication (The Australian National University, 2008a, para. 3.3[5], 3.3[6]), which must then conform to the guidelines of the relevant college of the university (Exhibit 1).

In general, PhD by publication rules require--as do those reproduced in Exhibit 1--that journal articles must be accompanied by introductory and concluding chapters. In contrast, some institutions require only a single preceding chapter, which introduces and summarises the published work. PhDs by publication may also need to conform to other requirements, such as presenting the thesis in conventional format (e.g., formatted to style and hardcover bound). Typically, three to five research articles are required to constitute a PhD thesis; however, this is very subject-dependent. Based on a survey of Australian examiners, Mullins and Kiley reported, "In the sciences . . . [t]his ranged from two to four good journal articles--not that the student had to have published these, but that there was sufficient material in the PhD to allow these articles to be published" (Mullins & Kiley, 2002, p. 379).

3.2. Research Subject Matter

The scope for PhD by publication is clearly determined in large part by the nature of the research. Some research topics are more amenable to progressive publication as discrete articles than are others. For example, research that requires data collection over a number of seasons (e.g., some animal behavioural studies) provides less opportunity for publishing early in the research process, and probably scope for fewer articles overall, than does the research topic of the first author's thesis. In more general terms, there may also be strong disciplinary differences, such as those between the sciences, arts, and social sciences (e.g., Kamler, 2008).

3.3. Intellectual Property

Most journals require that an author transfer the ownership of their intellectual property, including graphical material, to the publishers. PhD by publication may therefore preclude alternative publishing and distribution options. This can be an issue for some PhD projects, particularly those such as the first author's, which are undertaken in collaboration with external partners to whom a commitment is made to communicate research results. In this case, the intellectual property constraints imposed by prior publication limited the first author's options for information dissemination to these partners, few of whom have easy access to academic journals. Ultimately, they led the first author to invest substantial time in developing communication products which synthesised doctoral research outcomes in forms which did not transgress the intellectual property restrictions imposed by the journal in which these were first published. The time for development of such communication products would need to be factored into the work plans of similar PhDs by publication.

3.4. Supervisors' Attitudes

Kamler (2008) discusses the fundamental importance of supervisory support to doctoral students achieving publications either during or after their doctorates, and notes the differences between disciplinary communities in their attitudes to publication and co-authorship. She presents evidence that supervisory support for publication is more common in the sciences, where it usually involves co-authorship, which we discuss below.

Regardless of discipline, a student's supervisors may have strong views on the most appropriate approaches to thesis writing, and either encourage or discourage their students from pursuing the PhD by publication approach. In our experience, not all supervisors are aware that PhD by publication is a legitimate option, and some remain opposed to it on pedagogical grounds. Students considering PhD by publication should establish the perspectives of potential supervisors prior to appointment, and may need to consider changing supervisors if they are unable to resolve opposing views about the appropriateness of undertaking a PhD by publication.

3.5. Student Working Style and Writing Skills

In the first author's case, approaching the PhD by publication emulated her pre-existing working style as an environmental consultant, and proved an effective and efficient way to engage in doctoral research. However, the diversity of research students' personal characteristics and working styles means that students bring with them different approaches and skills to their research endeavours. For some, their personal working styles may militate against PhD by publication, although the second author's experience over 20 years of doctoral student supervision suggests that changing such working styles is necessary if students are to progress to publication of their PhD results and eventually to productive scholarly careers. The studies reported by Kamler (2008) support this conclusion. For other students, their technical writing

skills (see Torrance, Thomas, & Robinson, 1992), familiarity with the subject matter and analytical abilities may not be sufficiently developed in the earlier, or even the later, phases of PhD candidature to allow a strategy of PhD by publication.

Most universities now have centres and/or programs to help students develop their academic writing skills. For example, Cuthbert and Spark describe a pilot program established at Australia's Monash University in 2005, "with the aim of supporting higher degree research candidates in the Arts Faculty to commence and develop scholarly publications" (Cuthbert & Spark, 2008, p. 80). However, they suggest that commitment to this goal is not widespread, "at least within the humanities and social sciences" (p. 78), and note Garbus's observation that "even universities with dedicated writing centres report that graduates receive 'little assistance' to learn new ways of writing" (p. 78). Aitchison and Lee (2006) describe how research writing groups can be an effective means of assisting research students to write for publication, and Kamler (2008) discusses the importance of supervisors' support for and commitment to publication by doctoral students in achieving publication goals. Thus, the evidence for the benefits of universities investing in such programs is strong.

3.6. Co-authorship

The issue of co-authorship of publication can be vexed. While universities generally have policies and protocols on this issue (e.g., see The Australian National University, 2008b), their translation into practice is not always clear-cut. Some supervisors insist on co-authorship of articles written by their students, while others view this as unethical, except where a substantive contribution has been made--well beyond what is reasonably expected of a supervisor. These established norms vary between disciplines (Kamler, 2008), as well as between individuals. Kamler's research leads her to conclude that it would be desirable "to rethink co-authorship more explicitly as a pedagogic practice rather than as an output-driven manoeuvre to increase productivity" (Kamler, 2008, p. 292).

Co-authorship also raises issues for thesis examination. Powell's (2004) review found a need for clearer guidance to examiners of PhDs by publication, a conclusion also underlined by the results of Mullins and Kiley's survey of PhD examiners:

A small number of examiners expressed reservations about pre-publication, either because they were sceptical of the standards of many journals, or because they were concerned that the early publications might be the work of the supervisor or other members of the research team. (Mullins & Kiley, 2002, p. 381)

In all cases of co-authorship, examiners are likely to place "considerable importance on the issue of the candidate's contribution to multi-authored publications" (Wilson, 2002, p. 75). Many universities, including our own, require a declaration from the candidate describing the level of their contribution to co-authored articles included in the thesis.

In summary, the issue of co-authorship can cut both ways. Students may use co-authorship with supervisors as a deliberate strategy to increase the likelihood of publications being both written and ultimately accepted. Kamler's research (2008, pp. 286-290) illustrates the ways in which supervisors' active and responsible co-authorship can facilitate publication outcomes that might otherwise not be realised. Conversely, formal university protocols and disciplinary norms may not in themselves prevent supervisors claiming more credit for co-authored work than they should. Good practice requires that student and supervisors discuss the issue of co-authorship prior to embarking on collaborative writing, in the context of the university's policies, and establish a mutually-agreed approach consistent with those policies and professional ethics. This was the case for the two articles listed in the references which were co-authored with the first author's principal supervisor; it was also the case for this article, co-authored with a non-supervisor.

4. Advantages of PhD by Publication

This section discusses a range of reasons why the first author approached her PhD by publication, rather than following the traditional approach of first producing a thesis volume at the conclusion of the research. Some of these factors were evident at the commencement of doctoral studies, while others became apparent as the doctoral work progressed.

4.1. Accounting for Future Constraints

The process of publishing a journal article is typically so time-consuming and protracted that it is unlikely that many students will commit the necessary time, energy, and resources after thesis submission, unless they have taken up an academic position in which publications output is an important performance criterion. Even in these cases, creating the space necessary to bring publications to conclusion can be very challenging. In either case, a PhD graduate may have only limited interest in or opportunity to revisit their thesis and they are likely to be fully committed in new employment, which may not be closely related to their research topic. The resources and support necessary to facilitate publication are likely to be lacking or difficult to access, including the non-trivial consideration that supervisors' foci will have moved on to new students and, possibly, different research areas.

Some institutions, including our own school, have established writing fellowships as a strategy to facilitate publication by recent graduates, but these are only available and attractive to a minority of students. Universities can establish programs, such as that described by Kamler (2008, p. 293), to foster publications by early-career researchers. Whilst these are important, they are accessible to only a minority of PhD graduates.

4.2. Efficiency, Timeliness, and Feedback

The first author's research was set within a rapidly changing institutional context, typical of

those in the public policy arena (e.g., policy settings, legislative frameworks, government programs, the names and responsibilities of government agencies). For these reasons, many specific aspects of the information and data compiled and analysed for the thesis quickly became outdated. Whilst this did not diminish the relevance of the work to the doctoral research question or to informing the broader policy and research domain, it did narrow the window of time over which specific results could be reported into the policy arena. In this case, therefore, as in others with immediate policy or scientific relevance, pursuing a PhD by publication was an efficient strategy for both completing elements of the work in a timely way, and for negating the need to revise substantive elements. The need to fast-track publishing of highly context-specific research findings is further emphasised by the lengthy publication timelines shown in Figure 1--which ranged from 199 to 469 days, and averaged 334 days, from submission to publication for the six research articles published at the time of writing this article.

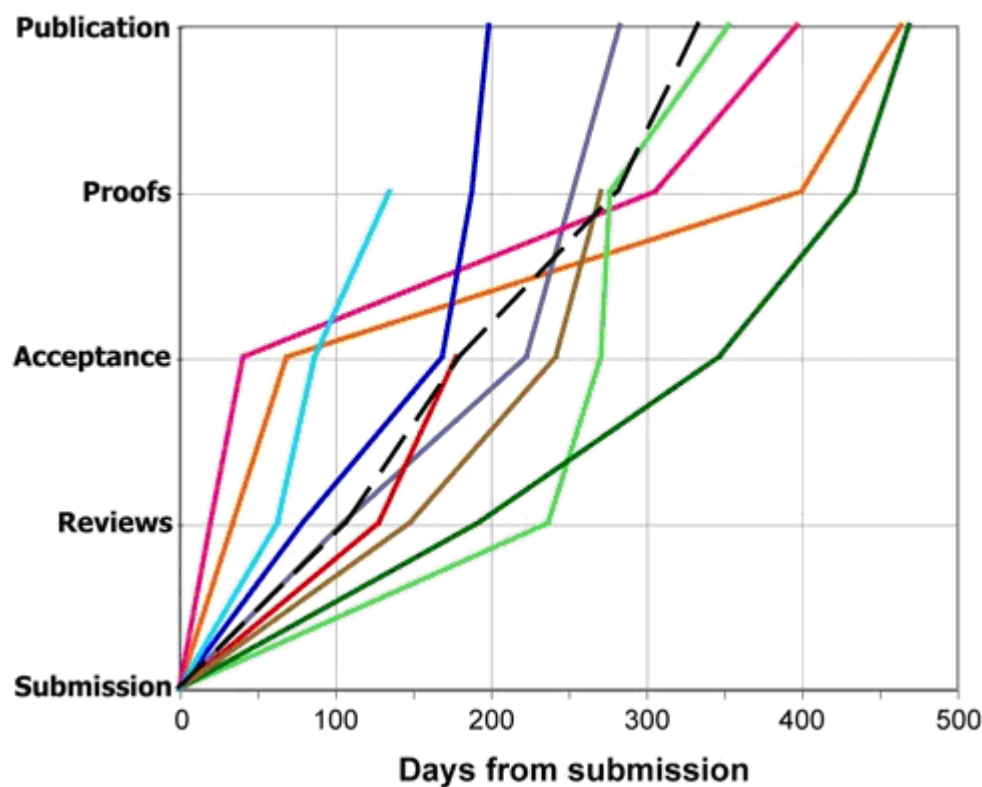


Figure 1. Durations of each phase of publication for nine journal articles--the broken line indicates the average timeline for each phase.

Note. Timelines from Submission to Reviews include resubmissions in the case of three articles.

Published articles also provide a resource that can be easily shared with others, and generate further interest, debate, and demand for information. Researchers often seek input from others to inform their work, and good practice dictates that those contributors should be informed of the outcomes of work which draws on their inputs. Published articles provide authoritative material in a form amenable to distribution to research participants, where appropriate (recognising that other forms of communication are likely to be necessary for particular audiences), and

demonstrable evidence that the input and efforts of informants have not been wasted.

4.3. Instilling Professional Work Practices and Fostering Academic Development

The process of developing a journal article, and responding to reviewer and editorial comments, instils a high level of discipline in a student's research conduct. It ensures that research methods are adequately documented and supported, that information and data are professionally presented and analysed, and that findings are set and discussed in the context of relevant literature. It also fosters attention to detail, such as correct and complete bibliographies, and ensures these are addressed progressively rather than as an afterthought.

Committing to PhD by publication exposes students to a process of continual review and criticism outside the domain of their direct supervisors and reference panels--for example, in the case of the first author, publishing the nine articles and one book chapter exposed her research to more than 25 reviewers. Whilst this presents its own challenges, as all who have submitted articles to independent peer review quickly become aware, it has many advantages--of exposing students to a wider community within their research domain, introducing new perspectives, and driving improvement in students' analytical and writing skills.

In short, as Kamler (2008) discusses, especially where the student is well-supported in the publication process by supervisors and other institutional processes, the experience of pursuing peer-reviewed publication is critical in developing the knowledge, skills, and self-confidence students will require to succeed in subsequent scholarly and professional work. Given that "if students publish in their formative years, they are more likely to do so as established academics or informed professionals in their chosen fields of practice" (Kamler, 2008, p. 292), this academic and professional formation--which is an explicit goal of many PhD programs, and rationale for public investment in them--may be one of the most important outcomes of pursuing PhD by publication.

4.4. Establishing Boundaries

It is easy for doctoral students to become overwhelmed by the challenge of becoming familiar with several bodies of literature, which typically characterise doctoral research. Pursuing a PhD by publication effectively partitions what is a large undertaking into smaller, more manageable pieces of work, and helps to establish boundaries around the relevant bodies of literature. It provides a framework for distinguishing between the most relevant literatures and the extent to which it is necessary to explore them. Taking this approach does not prevent fuller exploration of literatures of particular interest; it simply acts as a signal to ask whether the returns from further exploration are sufficiently beneficial.

4.5. Making Tangible Progress, and Building Credibility and a Research Profile

Undertaking a PhD can be very challenging in many ways (Kamler, 2008; Leonard, Becker, & Coate, 2004). One of these is the extended period of time over which PhD work is conducted; in Australian universities, this is commonly between 3 and a half to 4 years. In this context, publishing progressively provides material evidence of progress, which helps build self-confidence and creates a sense of achievement. Pursuing a PhD by publication involves iterations of intense writing, responding to reviews, making amendments, copyediting, and proofreading, with each cycle resulting in a completed product, and thus a sense of completion.

Publishing during PhD candidacy facilitates students establishing and developing a credible profile in their chosen research arena, through actively contributing to the relevant bodies of literature. This has obvious benefits for their career prospects post-PhD, but also opens doors and presents opportunities throughout the PhD process, some of which may otherwise not have arisen. For example, the first author was invited to author a peer-reviewed chapter in a book on the basis of its editor having read two of her journal publications, and one of her articles was short-listed for the relevant journal's award for Best Article 2006-2007. The first author's publication record was important in overcoming what appeared to be the prejudice of some in the policy and professional communities about the value of the work of students, and assisted in overcoming the stereotype--at least in many of these circles--of a doctoral student solely as a learner, rather than also as a contributor.

4.6. Accessing Resources and Influencing Agendas

Securing grant and scholarship resources to support doctoral research, particularly that which requires significant fieldwork or the like, is often one of the greatest challenges students and supervisors face. Funding agencies often give preference to supporting work that can demonstrate tangible and, preferably, short-term benefits. Presenting research outputs progressively, in the form of refereed articles, is an effective mechanism for demonstrating the value of research to existing or prospective funding agencies. For example, early publications output contributed to the first author being awarded a prestigious scholarship (Wentworth Group of Concerned Scientists, 2008) on the basis of demonstrating the relevance and connection of her research to high-profile public policy issues.

The first author had the expressed aim of wanting to inform and influence the direction of policy, programs, and research agendas in the domain of her research; this was facilitated through having peer-reviewed articles as the basis for dialogue and information exchange with policy-makers, policy-influencers, and researchers. In the case of one article, the journal selected it as the subject of a media release because of its policy relevance (Blackwell Publishing, 2007). Published articles provided a degree of legitimacy and authority, which enabled participation in policy-related processes.

4.7. Attracting Examiners and Expediting the Examination Process

The process of examining a thesis is demanding and time-consuming, and is an implicit rather than explicit duty in the case of academics. The remuneration for examining a thesis is minor for an academic or non-academic examiner; in the case of Australia, it is around AUD 300, and so examiners are likely to be motivated by factors other than remuneration. Formally, a prospective examiner is usually informed only of the thesis title and perhaps the abstract, although other information may be communicated informally through a supervisor. A potential examiner therefore may or may not be aware that all or aspects of a thesis have been published; however, if the student has been undertaking a PhD by publication, it is likely that the examiner will have been exposed to a student's published work, and this may encourage them to accept the invitation to examine the thesis.

For example, the comments of experienced examiners suggest that some, at least, are favourably influenced by doctoral publications: "Lightens the burden for the examiner as other reviewers have said that is OK, and if there are two or three good publications you can put your feet up and go for an interesting drive" and "It [pre-publication] immediately suggests the student deserves the degree" (Mullin & Kiley, 2002, p. 381).

Although most universities ask examiners to respond within 6-8 weeks, in reality it is not uncommon for the process of examination to take as long as 6 months from thesis submission. For the reasons stated above, submitting a PhD by publication is likely to reduce the response time of examiners. If the task of examination is perceived as easier and quicker, an examiner is likely to conduct their assessment sooner. From a sample of 30 experienced examiners, Mullins and Kiley found:

Half our sample explicitly acknowledged that they were favourably influenced by the fact that a candidate's work had been accepted for publication in a reputable journal. For most of the remainder of the sample, in all cases from the humanities and social sciences, the question was not particularly relevant to their experience, since pre-publication was not common practice in their disciplines. (Mullin & Kiley, 2002, p. 381)

Submitting a PhD by publication may also reduce the likelihood that examiners will require major revisions. Major revisions can be difficult to address once a student has moved from the university environment into employment elsewhere, for reasons such as competing commitments, resource constraints, and reduced access to supervisors. These constraints are often exacerbated for international students. While submission of a PhD by publication offers no guarantee of how the examiners will see the thesis, acceptance of the work in peer-reviewed journals is likely to assure examiners that the work is of thesis quality. Substantive revisions are likely to be confined to those parts of the thesis--such as introductory and concluding sections--that have not been published.

For the student, a faster examination process means graduating earlier, and a faster track to PhD-dependent opportunities. In some cases, job prospects or pay scales may be constrained until the

PhD award is realised. In some university funding systems, such as Australia's, delayed PhD completions may also incur financial disadvantage for the university at which the student is enrolled.

5. Disadvantages of PhD by Publication

This section discusses some of the disadvantages that students may experience when pursuing a PhD by publication.

5.1. Lengthy Timeframes

In the multiple discipline areas in which the first author's work was conducted (section 2), the overall timeframe for publication was typically quite long. This was the case for a number of reasons.

Meeting the specific requirements for journal submission can be time-consuming. Formatting reference lists can be tedious: standard templates provided by bibliographical software packages such as *EndNote* did not match the journal requirements for any of the nine articles published from the first author's doctoral work. Editorial rejection and resubmission to another journal can double the time expended on this activity. The electronic submission systems used by many journals expedite submission in some respects, but can be laborious to use, especially where Internet access is not fast.

The editorial processes followed by journals also take time. In the case of articles from the first author's doctoral work, the duration of each stage for each article is summarised in Figure 1. It comprises the following components:

- (a) awaiting reviewers' comments, including resubmissions: 20-237 days (nine articles, average 108 days),
- (b) awaiting acceptance: 21-155 days (nine articles, average 73 days),
- (c) awaiting proofs: 6-331 days (eight articles, average 102 days), and
- (d) awaiting publication (hardcopy or online): 11-91 days (six articles, average 51 days).

Consequently, the process of writing the article through to receiving it in-print can prove somewhat frustrating and wearing when superimposed on a student's day-to-day research workload. Figure 2 shows the timeline, in days from submission of the first article, for different stages of the publication process of the first author's doctoral publications, illustrating how the demands of publishing are distributed widely, if not regularly, throughout the PhD candidacy. However, publishing timeframes are less daunting when viewed from the perspective of the interval from article submission to its acceptance (rather than in-print or online access), which ranged from 41-347 days, and averaged 181 days for the nine articles.

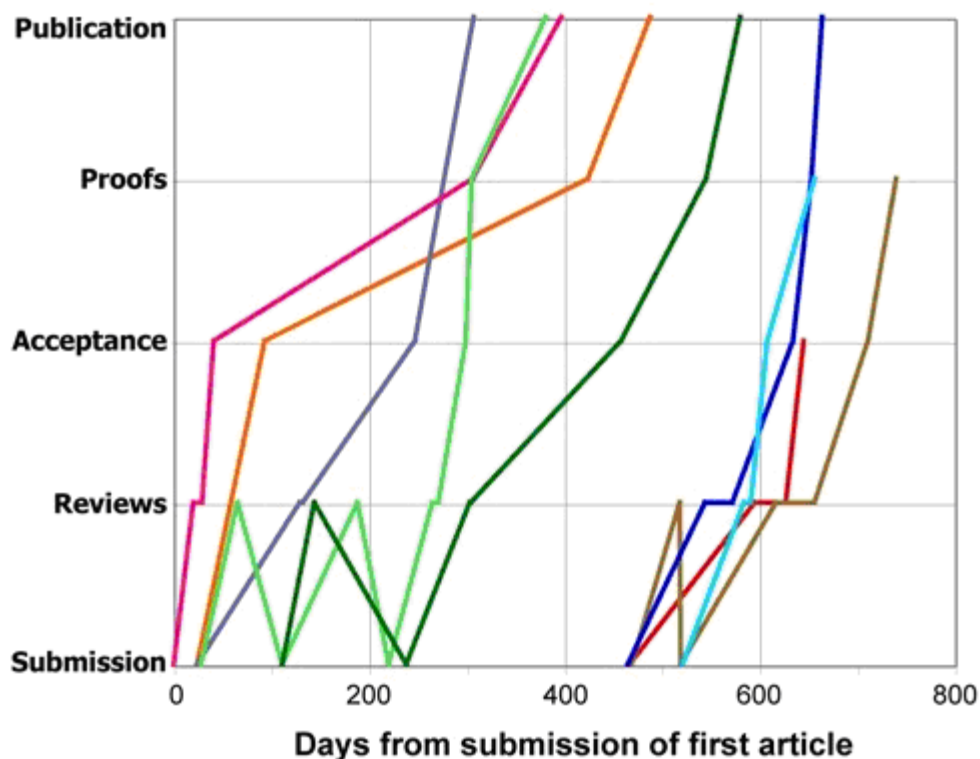


Figure 2. Progress of nine journal articles through stages of publication, from the date of submission of the first article.

Note. Horizontal lines represent the time taken by the author(s) to address reviewers' comments.

5.2. Engagement with the Academic Community

The commitment of time required for publication per se, as discussed above, in addition to the commitment to the normal course of doctoral research itself, limits the extent to which students pursuing PhD by publication can engage in a broader set of activities in the immediate academic community of which they are part. For example, the first author of this article made a conscious decision to focus her efforts on publications, and limit her activities in the school and university communities. In doing so, she also forfeited some of the potential benefits which had attracted her to PhD studies, particularly those associated with being part of an academic community. Of course, each student makes individual choices, usually in discussion with their supervisors as well as with others, about how to allocate their time. These choices are also constrained by personal and financial circumstances.

5.3. Workload for Supervisors

The process of PhD by publication is likely to add to the workload of supervisors across the period of the PhD, depending on the extent to which they are prepared to support their students in pursuing publication. In the case of the articles represented in Figure 1, supervisors were prepared--to varying degrees, depending on their roles and other commitments--to read draft

versions of the articles and to assist in responding to reviewers' comments. As Kamler (2008, pp. 286-290) notes, these contributions, including advice on how to deal with rejection and sustain momentum, can be critical to achieving eventual publication.

Of course, publishing progressively throughout the period of doctoral enrolment is likely to spread the reading and reviewing workload of supervisors more evenly throughout the period of doctoral candidacy (Figure 2), rather than demanding major input in the period immediately prior to submission, as is often the case in traditional PhDs.

5.5. Constraints to Directional Change

A disadvantage of pursuing PhD by publication is that, once an article has been submitted, there is limited scope for further developing or changing the thinking and approach it represents, and the conclusions it reaches. Whilst there is some opportunity to modify elements of text, add further references and insert graphics at the time of addressing reviewers' comments, the substantive content of the article will not be revised unless the reviewers require it.

This reality is perhaps most problematic for articles submitted early in the research process, and suggests that the timing of submission of such articles needs careful consideration and discussion with supervisors. However, given that evolution in thinking, change on the basis of evidence, and attendant debates are fundamental to research processes, the evolution of argument in a PhD by publication can be represented as both necessary and desirable. The particular challenge to students pursuing PhD by publication is to articulate any such changes in ways which enhance, rather than diminish, the coherence of the thesis and its eventual, overall outcomes.

5.6. Concurrent Review and Examination Processes

Given the timelines associated with publication discussed in subsection 5.1, it is likely that submission of articles in the later phase of the doctoral process will mean that a student's thesis may be undergoing examination at the same time as articles are undergoing review. This may result in the need to make revisions to both documents separately, and may make reconciling differing reviewer/examiner perspectives problematic. Clearly, it is more efficient if the student can bring all publications to the stage of acceptance prior to thesis submission.

6. Conclusions

While PhD by publication is allowed at many universities, and is becoming more common, it remains relatively rare. Institutional pressures generated by university funding models and performance assessments, and the advantages to doctoral students' subsequent career opportunities of a publications track record, are likely to encourage more widespread adoption of this model of doctoral education. There are also compelling arguments, such as those advanced

by Kamler (2008), that enabling publication by doctoral students facilitates their development as scholars and professionals.

Our own experiences--as a doctoral student and doctoral supervisor, respectively--suggests that there are both advantages and disadvantages for a student pursuing PhD by publication, where their research topic and methods allow. Kamler's (2008) study demonstrates that support from supervisors--as a fundamental requirement for PhD by publication--is more common in the sciences, where it is usually recognised by co-authorship, than in the arts and social sciences, where co-authorship has not been seen as the norm. However, the first author's experience, as a doctoral student in the social sciences, demonstrates that such support, and consequent publication, need not be confined to the sciences. More generally, our experiences confirm that the active support of supervisors is central to enabling publication by doctoral students, and to its fuller expression in a strategy of pursuing PhD by publication. Our personal experiences also suggest that there is considerable merit in Kamler's (2008, p. 292) proposal "to rethink co-authorship more explicitly as a pedagogical practice," and to clarify "expectations about co-authorship as ethical practice," in both the sciences and the social sciences.

The advantages and disadvantages which we have described for pursuing PhD by publication will be familiar to many research students and supervisors. In the case of the first author's PhD, the research topic, her individual working style, the benefits of establishing credibility and profile for the research, and the anticipated post-PhD commitments, all strongly favoured PhD by publication; this strategy was championed by her primary supervisor. Many of these characteristics are shared by other, though not all, doctoral research topics and students. In many cases--perhaps the majority--it will be more practicable to pursue a strategy of publishing some articles from the thesis during the doctoral student's candidacy, rather than a strategy of PhD by publication per se. For the range of reasons outlined in the Introduction, strengthening the mechanisms by which universities and supervisors support doctoral students to achieve even modest publication objectives would seem highly desirable. Finally, for that cohort of doctoral students whose research topic, working style, and other factors favour PhD by publication, our experience suggests that--for the reasons we have described in this article--PhD by publication is an advantageous and beneficial strategy.

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